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Iowa Crop Performance Tests

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Abstract
The Iowa Crop Performance Tests (ICPT) are conducted each year to provide information farmers need to select the best varieties or hybrids for their production conditions. The Southeast Research Farm (SERF) has hosted these soybean experiments each year since 2005, and two corn experiments since 2009. This information and more can be downloaded from www.croptesting.iastate.edu.

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Iowa Crop Performance Tests

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Introduction

The *Iowa Crop Performance Tests* (ICPT) are conducted each year to provide information farmers need to select the best varieties or hybrids for their production conditions. The Southeast Research Farm (SERF) has hosted these soybean experiments each year since 2005, and two corn experiments since 2009. This information and more can be downloaded from www.croptesting.iastate.edu.

The soybean experiments grown in 2010 at the SERF were planted May 25 and harvested October 8. There were 38 varieties in the conventional-herbicide test—which also included Roundup Ready 2 Yield (RR2Y) and Liberty Link (LL) varieties. The glyphosate-herbicide tests included both Roundup Ready (RR) and RR2Y varieties. There were 35 lines in the early-season test (maturity of 2.8–3.2) and 28 lines in the full-season test (maturity 3.3–3.9).

The corn experiments at SERF were planted April 19 and harvested September 29. There were 42 hybrids in the early season test (relative maturity of 109–112 days) and 30 hybrids in the full-season test (relative maturity of 112 days or more).

Materials and Methods

The testing methodology is very similar between the corn and soybean tests. All experiments are randomized using a row-column lattice design. Entries were grown in four-row plots with a row spacing of 30 in. The soybean seeding rate was 8 seeds/foot (140,000 seeds/acre), and the corn planting rate was 34,500 plants/acre. Except for the conventional-herbicide soybean test, all entries were subdivided into an early-season or full-season test. The two center rows of each plot were harvested for yield estimation.

Discussion and Results

Data interpretation. The ICPT trials at SERF are part of a statewide project aimed at providing unbiased third-party information for growers to use in making hybrid or variety selections. Each of the experiments grown at SERF were also grown at other locations in south-central and southeast Iowa to measure performance under different growing conditions. The soybean tests were also conducted near Orient, Indianola, and Fairfield (no conventional-herbicide test at Fairfield.) The corn tests were also grown near Winterset, Indianola, and Cedar, IA.

The average yield of each experiment provides a general idea of the 2010 growing season (Tables 1 and 2.) The relative performance of the entries within each test is always interesting to review, and can sometimes show you if a different variety may have performed better or worse than the varieties grown on your farm. But the real value comes from combining data from SERF with the other southern locations in a combined analysis.

Variety selection. Variety selection is not about identifying which lines did best over the past year—it is about predicting which lines will do best in the future.

For selection purposes, predictive information for yield potential should come only from multi-environment trial averages. Why? Yields at a given location are a measure of the interactions of the varieties (genetics) with the environment (everything else). In these

experiments, the environment is comprised of soil type(s), soil conditions, weather, nutrients, pests, pathogens, and any other factor that can impact the expression of genetic yield potential during that season. But the only factors we can know for next season will be the soil type(s) where we plant and the varieties we choose. Because of this, results from a single-location trial in one season cannot be expected to be duplicated in another season.

Since it is highly unlikely that next season's conditions will be the same as those in any single-location report, the probability of success is increased by selecting a variety that performs well in many environments. These are identified only in the multi-location summaries.

Understanding the data. The most important aspect of reviewing yield trial data involves understanding the inherent variability within any experimental data. Information like the least significant difference (LSD) is useful to help sort entries. The LSD for each experiment is provided at the bottom of each table. It is an estimate of the variability within an experiment. If the difference between two entries is greater than the LSD value, it is reasonably certain that the entries differ in their genetic potential for the character. Any entries that differ by less than the reported LSD should be considered equal for that trait. Measurements within an LSD could be due to a number of different factors, including measurement variability or random chance. These differences are not considered to be significant and are not likely to be consistently repeatable.

At Iowa State University, the most comprehensive source of information for corn and soybean yields and several defensive traits is the Iowa Crop Performance Tests. The final reports, all descriptive information, and all data collected can be viewed online at www.croptesting.iastate.edu.

Acknowledgements

The experiments conducted at SERF are an important component of the ICPT program. These tests are conducted as experiments, not contests. Kevin Van Dee and his staff are acutely aware of this distinction. They are quite accommodating in providing services to ICPT. This helps ensure the success of these experiments, which provides a great deal of useful information to growers in southeast Iowa. The Corn and Soybean Variety Testing Program appreciates the help.

Table 1. Soybean summary information for SERF.

Conventional herbicide experiment

	Yield[a]	Protein[b]	Oil[b]
Experiment mean	48.3	35.3	17.9
Minimum mean	40.2	33.0	16.2
Maximum mean	54.9	38.9	19.4
$LSD_{(0.25)}$	3.3		

Early season glyphosate experiment (mat 2.8-3.2)

	Yield[a]	Protein[b]	Oil[b]
Experiment mean	48.5	36.2	17.9
Minimum mean	38.3	35.0	16.8
Maximum mean	57.3	37.6	19.5
$LSD_{(0.25)}$	3.8		

Full season glyphosate experiment (mat 3.3-3.9)

	Yield[a]	Protein[b]	Oil[b]
Experiment mean	49.5	35.8	18.0
Minimum mean	44.0	34.3	16.9
Maximum mean	55.2	37.4	19.1
$LSD_{(0.25)}$	2.7		

[a]Yield is listed as bushels/acre, adjusted to 13% moisture.
[b]Protein and oil are percentages, on a 13% moisture basis.

Table 2. Corn summary information for SERF.

Early season experiment (RM 109-112)

	Yield[c]	Moisture[d]
Experiment mean	140.1	16.7
Minimum mean	110.4	14.5
Maximum mean	179.0	20.3
$LSD_{(0.25)}$	14.2	0.5

Full season experiment (RM 112 and greater)

	Yield[a]	Moisture[b]
Experiment mean	160.5	17.7
Minimum mean	133.7	14.6
Maximum mean	189.7	20.7
$LSD_{(0.25)}$	10.2	0.5

[c]Yield is bushels/acre, adjusted to 15.5% moisture.
[d]Moisture is percentage, measured at harvest.